Hearing Loss Prevention for the Soldier

Army Hearing Program

Readiness, Operational, Hearing Conservation, Clinical

Approved for public release, unlimited distribution

UNCLASSIFIED

BRIEFING OUTLINE

PURPOSE: To provide strategies for effectively minimizing noise-related threats in the training environment.

1. **Scope of Threat**
2. **Hearing & Noise**
3. **Hazardous Noise Levels**
4. **Threat Mitigation: Hearing Protection**
5. **Operational Hearing Services**
6. **Combat Experiences**
7. **Conclusion**

SCOPE OF THE THREAT

- ***Permanent* Hearing Loss = Top Four Injuries in Current OE**

- **Current OPTEMPO**
  - **Hearing Loss & Noise at highest rate in 30 years**

- **7/10 Injuries are Due to Explosions and Blasts**
  - Potential Acoustic Trauma – 1 in 3 Soldiers
  - 50% of blasts result in damage to inner ear

- **Hearing Loss is the Only Injury without Symptoms**
  - No sensory nerves in the inner ear_
  - Gradual or Sudden – no way to predict Soldier susceptibility to loss
  - *Always* Cumulative

Response to Threat: The Army Hearing Program

Readiness, Operational, Hearing Conservation, Clinical

Prevention & Education are Key

- **Understand the Threat**
- **Employ strategies to minimize Threat**

HOW CRITICAL IS HEARING?

For Soldiers, Good Hearing is Necessary:

- Survivability and Lethality
  - HEAR the enemy before seeing them!
- Sound can be heard:
  - In the dark or inclement weather
  - 360 Degrees - comes from all directions
  - 24 hours a day – 7 days a week
- Collect intelligence
  - 50-60% of Situational Awareness is hearing; % increases when visibility is limited
  - Tactical Intelligence (SitReps,latest enemy TTPs)
  - Interaction with civilians (reliance on interpreters)

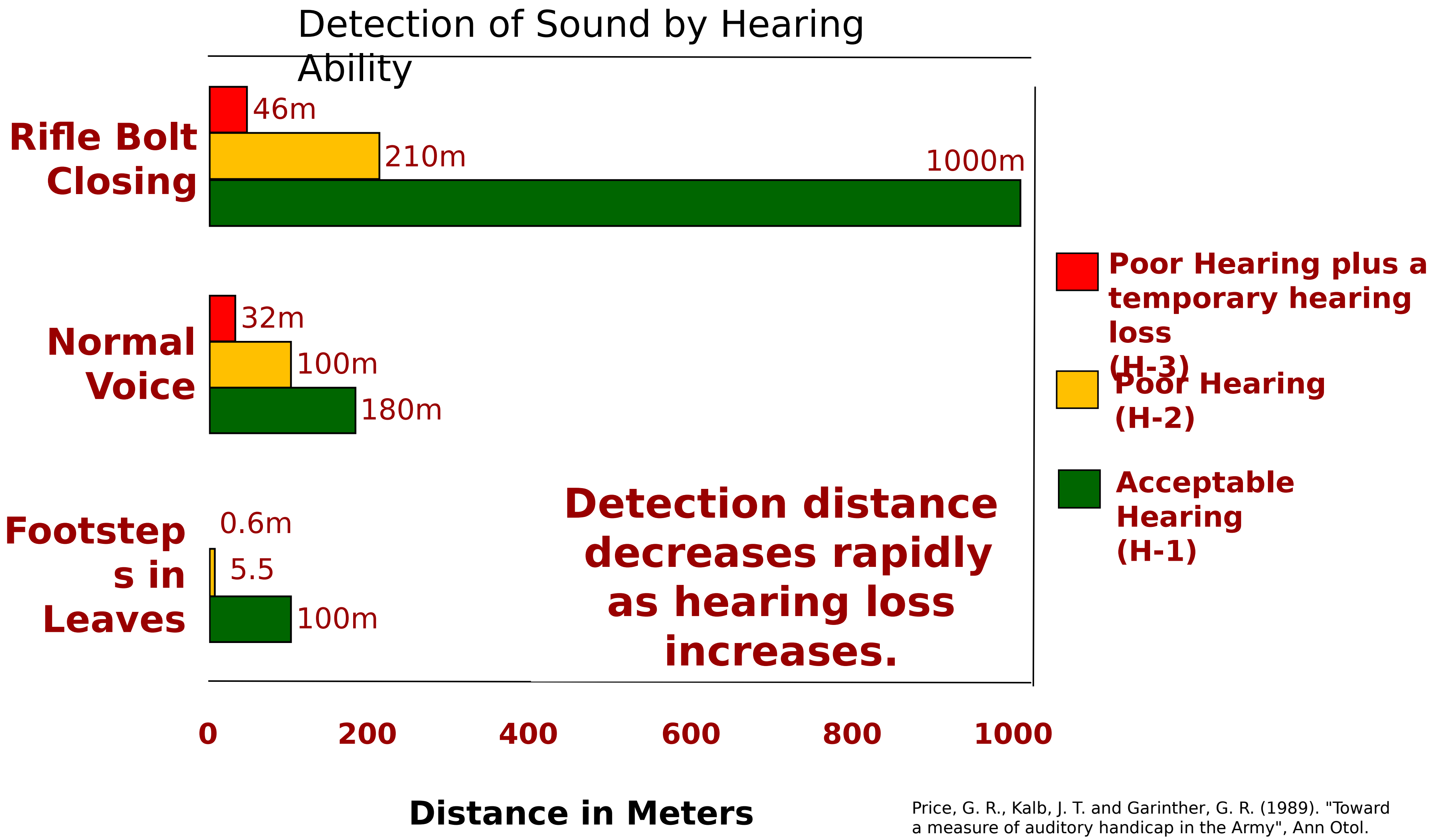
Why *OPERATIONAL* Hearing?

Example: Tank Crew performance with & without hearing loss

	Word Understanding	
	GOOD Hearing	POOR Hearing
Time to identify target	40 sec.	90 sec
Incorrect command heard by gunner	1%	37%
Correct target identification	98%	68%
Enemy targets killed	94%	41%
Wrong target shot	0%	8%
Tank crew killed by enemy	7%	28%

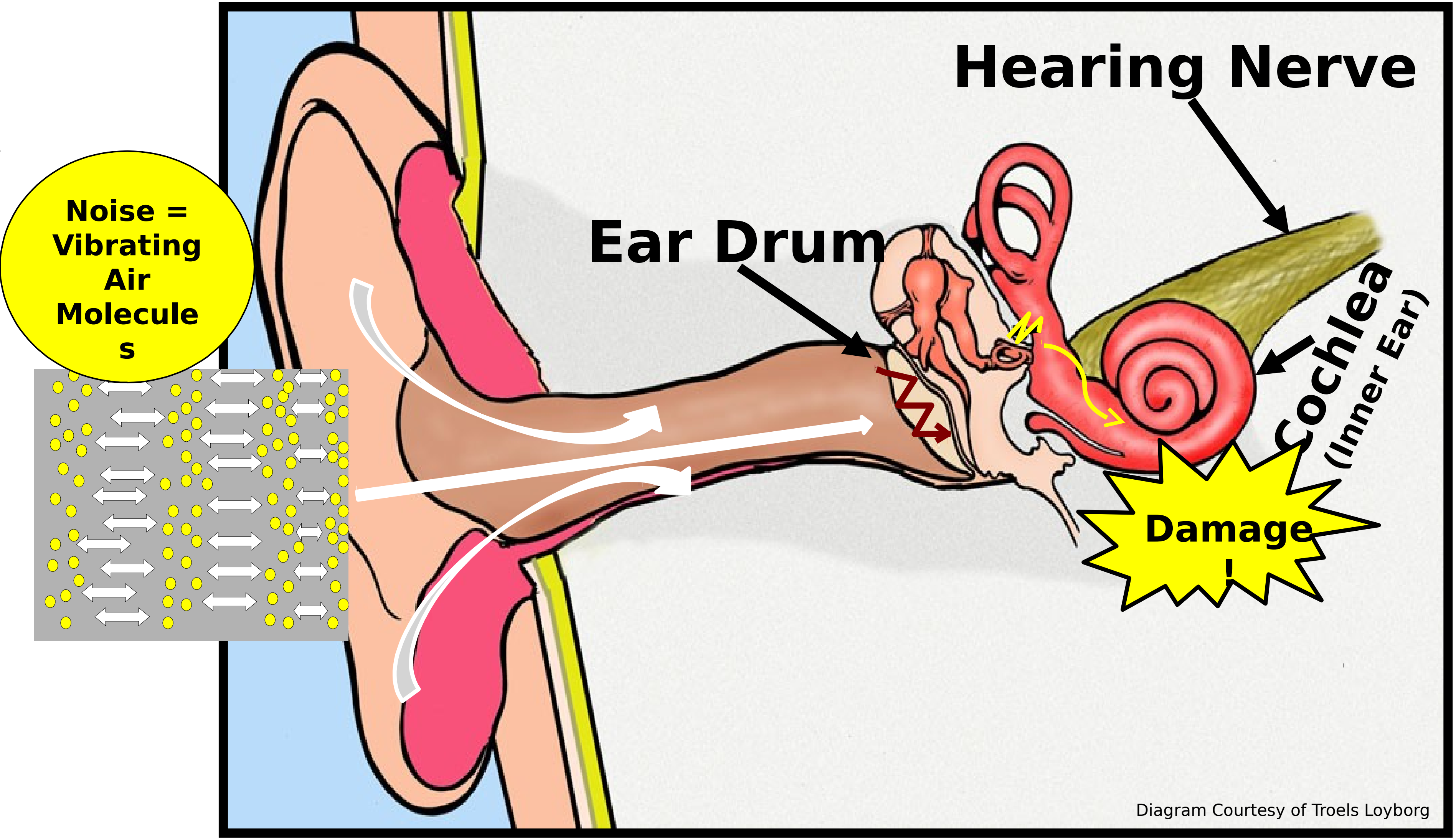
(Garinther & Peters, Army Res., Development, & Acquisition Bull. 1990; Jan.-Feb: 1-5)

CONSEQUENCES OF HEARING LOSS



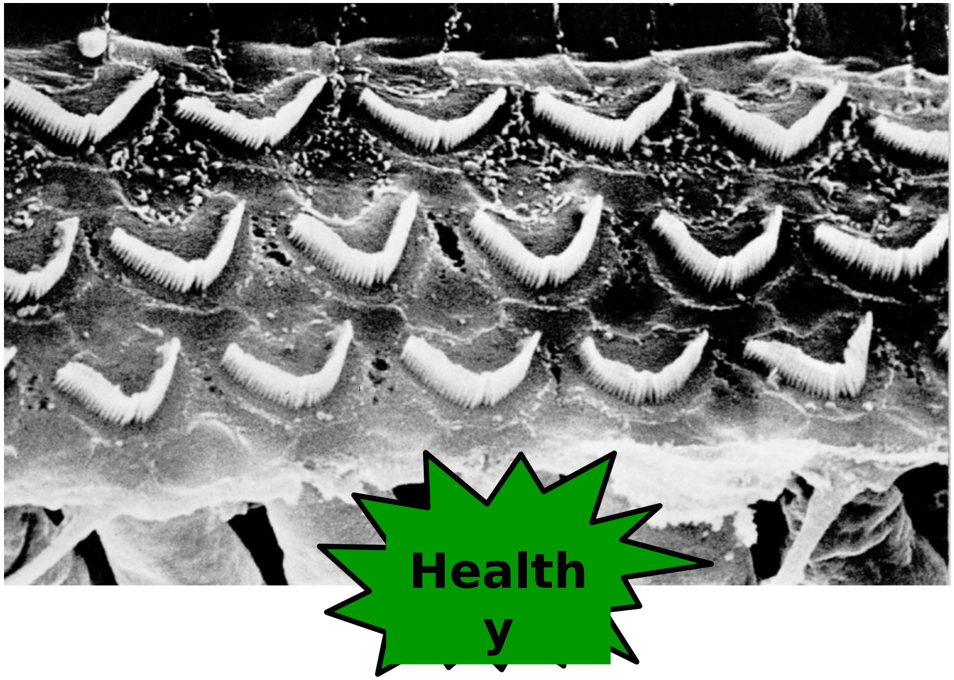
Price, G. R., Kalb, J. T. and Garinther, G. R. (1989). "Toward a measure of auditory handicap in the Army", Ann Otol. Rhinol. Laryngol. 98, 42-52.

HEARING AND NOISE

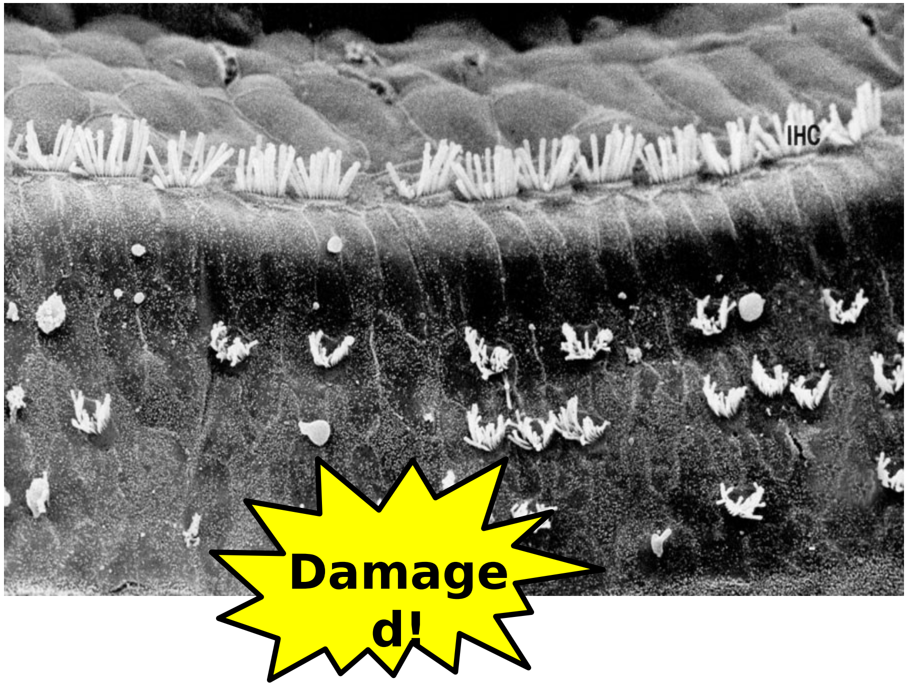


INSIDE THE COCHLEA

Healthy Hair Cells (Hearing Nerve Endings)



Hair Cells Damaged by Noise



HAZARDOUS NOISE LEVELS

Noise Levels which Cause Hair Cell Damage:

- **Steady-state Noise > 85 dBA**
  - Steady-state noise = noise > ½ second in du
    - All tactical vehicles (including HMMWVs)
    - Most generators
    - Rotary wing aircraft
  - Tends to cause *gradual* hearing loss

- **Impulse/Impact Noise ≥140 dBp**
  - Explosions (IEDs, grenades, artillery,
  - All Weapons (including M16s = 156 dBpSPL)
  - Can cause *gradual or sudden* hearing loss

HAZARDOUS NOISE LEVELS

Three Foot Rule

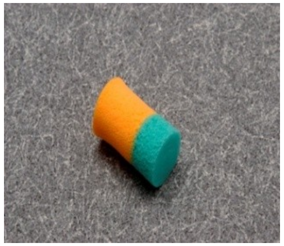
(For Steady-State Noise)

If the sound is so loud that you must raise your voice to be understood at a distance of three feet it is…

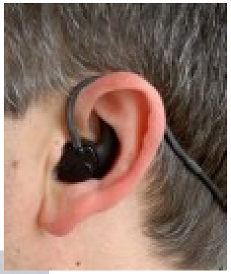
POTENTIALLY HAZARDOUS

Fact: *Exposure to engine noise in a 4-hour convoy can be as damaging to hearing as one IED explosion*

HEARING PROTECTION



- **Earplugs**
  - **Pre-formed**
    - **Single Flange**
    - **Triple Flange**
    - **Quad Flange**
    - **Combat Arms Ear Plugs**
  - **Hand-formed (foam)**
- **Proper Fit:**
  - **Pull back on ear to straighten ear ca**
  - **Vacuum seal – hollow sounding voic**
- **Nonlinear earplugs, e.g., Combat Ar**
  - **Button flat when in vehicles or aircra**
  - **Button at an angle when firing**
- **Tactical Communications and Protective Systems**

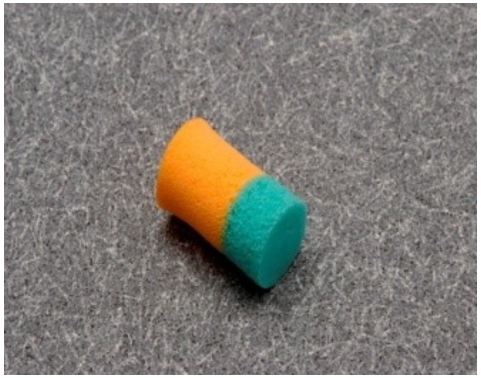


How’s the fit?

Triple Flange Earplugs with Insertion Tool

How's the fit?

Bi-Colored Foam Earplug



Combat Arms Earplug

- **Proper Fit:**
  - **Pull back on ear to straighten ear canal**
  - **Vacuum seal – hollow sounding voice**

Good fit or Bad fit?

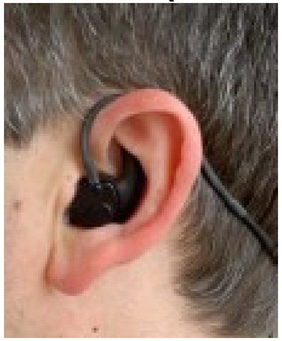
OPERATIONAL HEARING SERVICES

Definition:

Hearing injury prevention and communication support services delivered to the Soldier in every environment with the primary objective of enhancing ***survivability*** and ***lethality***.

Services:

- Tactical Communications and Protective Systems (TCAPS)
- Noise surveillance
- Injury prevention
- Injury treatment



Consequences of Hearing Loss

- Listening posts
- On point and on patrol
- Call for fire
  - NOTE: Most fratricide occurs as a result of poor communication,
    not poor plotting or poor calculations
- Urban warfare

Solutions:

- Prevent hearing loss without compromising the mission
- Use Tactical Communications and Protective Systems (TCAPS)
- Use hearing protection specific to your mission needs
- Ensure noise controls are used whenever possible

Combat Experience

Photo courtesy of US Army

Actual Event:

Vehicle contained four occupants: driver, TC, gunner, and passenger.

All occupants were wearing earplugs: two had Combat Arms Earplugs, one had triple flange, and one had foam earplugs.

An IED exploded under the driver.

Because of their hearing protection, all of the Soldiers recovered their hearing fast enough to continue evasive maneuvers while communicating with leaders.

Bottom Line: The best EARPRO is the EARPRO worn properly when needed.

Hearing is Critical

Soldiers must consider
EARPRO a standard part of their kit.

Track your helmet, eye protection, armor, and ***EARPRO.***

A Soldier's hearing is critical to survival and mission success.

CONCLUSION

- Hearing is a critical Soldier sense
- Ability to understand speech *increases* when background noise is reduced through EARPRO use
- Noise reduction plus protection reduces fatigue
- Train as You Fight – Train with EARPRO and you will fight with EARPRO
- Noise-Induced Hearing Loss is NOT inevitable for the Soldier
- Hearing Protection is a *Critical* Component of Soldier gear

Hearing Loss is:

Painless

Permanent

Progressive

Preventable!